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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/878,333	06/12/2001	Shozo Nagai	010743	2178

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EXAMINER

WILKINS III, HARRY D

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 05/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/878,333

Applicant(s)

NAGAI ET AL.

Examiner

Harry D Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 18 March 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai et al (JP 09-225679) in view of Stern (US 4,507,264).

Nagai et al teach (see claims 1-3) a Ni-base brazing alloy that contains 10-30 wt% Cr, 2-11 wt% P and 1-10 wt% Si, where P+Si is 10-13 wt%, with the balance being Ni. Nagai et al teach (see abstract) that the alloy is useful for brazing at about 1050°C (i.e.-a range which would include 1100°C).

The range of Cr and P+Si disclosed by Nagai et al overlaps the presently claimed range. The ranges of P and Si disclosed by Nagai et al wholly contain the claimed ranges. It would have been within the expected skill of a routineer in the art to have optimized the composition of P and Si within the disclosed range in order to achieve the

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best brazing properties of the alloy, such as wettability (see English abstract for support).

Nagai et al do not teach that the brazing alloy contains at least one of Al, Ca, Y and Misch metal in an amount of 0.01-0.10 wt%.

Stern teaches a Ni-base brazing alloy in the same field of endeavor as the alloy of Nagai et al. Stern teaches (see col 3, lines 16-19) that Y in brazed joints combines with Cr and Al to form an improved microstructure that is more resistant to sulfidation and oxidation. Stern also teaches (see col 4, lines 31-41) the other effects of Y. Stern teaches (see abstract) adding 0.01-0.03 Y.

Therefore, it would have been obvious to one of ordinary skill in the art to have added Y at 0.01-0.03 wt% as taught by Stern to the alloy of Nagai et al because Stern teaches that the Y improves the alloy by making it more resistant to sulfidation and oxidation.

Regarding claim 2, the Ni-base brazing alloy of Nagai et al contains (see claims 2 and 3) less than 5 wt% Mo, less than 5 wt% Fe and less than 1 wt% Co.

4. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai et al (JP 09-225679) in view of Brill (US 5,603,891).

Nagai et al, as above, teach a Ni-base brazing alloy that contains 10-30 wt% Cr, 2-11 wt% P and 1-10 wt% Si, where P+Si is 10-13 wt%, with the balance being Ni. Nagai et al teach (see abstract) that the alloy is useful for brazing at about 1050°C (i.e.- a range which would include 1100°C).

Nagai et al do not teach that the brazing alloy contains at least one of Al, Ca, Y and Misch metal in an amount of 0.01-0.10 wt%.

Brill teaches (see abstract) a similar Ni-base composition containing 25-30 wt% Cr and 2.5-3.0 wt% Si. Brill teaches (see col. 2, lines 39-47) that Ca and rare earths are added to the alloy and interact with Cr to improve oxidation resistance due to the build up of a thin protective oxide layer.

Therefore, it would have been obvious to one of ordinary skill in the art to have added Ca and/or rare earths (as misch metal) as taught by Brill to the alloy of Nagai et al in order to improve oxidation resistance.

Regarding claim 2, the Ni-base brazing alloy of Nagai et al contains (see claims 2 and 3) less than 5 wt% Mo, less than 5 wt% Fe and less than 1 wt% Co.

5. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama (US 6,203,754) in view of Brill (US 5,603,891).

Sugiyama teaches (see abstract) a brazing filler metal for brazing at 1060-1120°C which contains 20-30 wt% Cr, 3-10 wt% P and 2-7 wt% Si with the balance being Ni.

Sugiyama fails to teach adding one of Al, Ca, Y or misch metal (a mixture of rare earth metals) to the brazing alloy.

Brill teaches (see abstract) a similar Ni-base composition containing 25-30 wt% Cr and 2.5-3.0 wt% Si. Brill teaches (see col. 2, lines 39-47) that Ca and rare earths are added to the alloy and interact with Cr to improve oxidation resistance due to the build up of a thin protective oxide layer.

Therefore, it would have been obvious to one of ordinary skill in the art to have added Ca and/or rare earths (as misch metal) as taught by Brill to the alloy of Sugiyama in order to improve oxidation resistance.

Response to Arguments

6. Applicant's arguments filed 18 March 2003 have been fully considered but they are not persuasive. Applicant has argued that it would not have been obvious to have added Y as taught by Stern et al to the brazing alloy of Nagai et al.

In response to Applicant's arguments, the evidence in the prior art supports the facts that Y was well known to add oxidation resistance in all Ni-based alloys. In particular see Table 2 on page 17 of "Nickel, Cobalt and Their Alloys" and Table 1 on page 167. From each of these it can be seen the Y and indeed the other rare earth elements were known to improve the oxidation resistance of all Ni-base alloys by improving the adherence of an oxide scale. Thus, based on the evidence in the prior art, it was known that Y, and similar rare earth metals, added oxidation/corrosion resistance to any Ni-based alloy.

In response to the argument that the Examiner does not address why one skilled in the art would be compelled to add Y to Nagai et al when the reference does not state a need for high temperature corrosion resistance, even though Nagai et al do not expressly teach a need for the high temperature corrosion resistance, since Nagai et al is related to a brazing material for heat exchangers or turbine engines, both of which are exposed to high temperatures, one of ordinary skill in the art would have been motivated to seek out ways to improve the high temperature corrosion resistance so

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that the brazed heat exchanger or turbine engine could be operated at higher temperatures (particularly important for efficiency of the gas turbine).

At the very least, "Nickel, Cobalt, and Their Alloys" teaches that Y and the rare earth metals are functional equivalents, and it would have been obvious to substitute Y for the rare earth metals taught by Brill.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 6:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
May 8, 2003

ROY KING 
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700